United States Patent

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Continuation-in-part of application Ser. No. 839,016, July 3, 1969, now Patent No. 3,548,118.

[54] **SELF-SUPPORTING HEADSET**
4 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **179/156**
[51] **Int. Cl.** **H04m 1/05**
[50] **Field of Search** 179/156

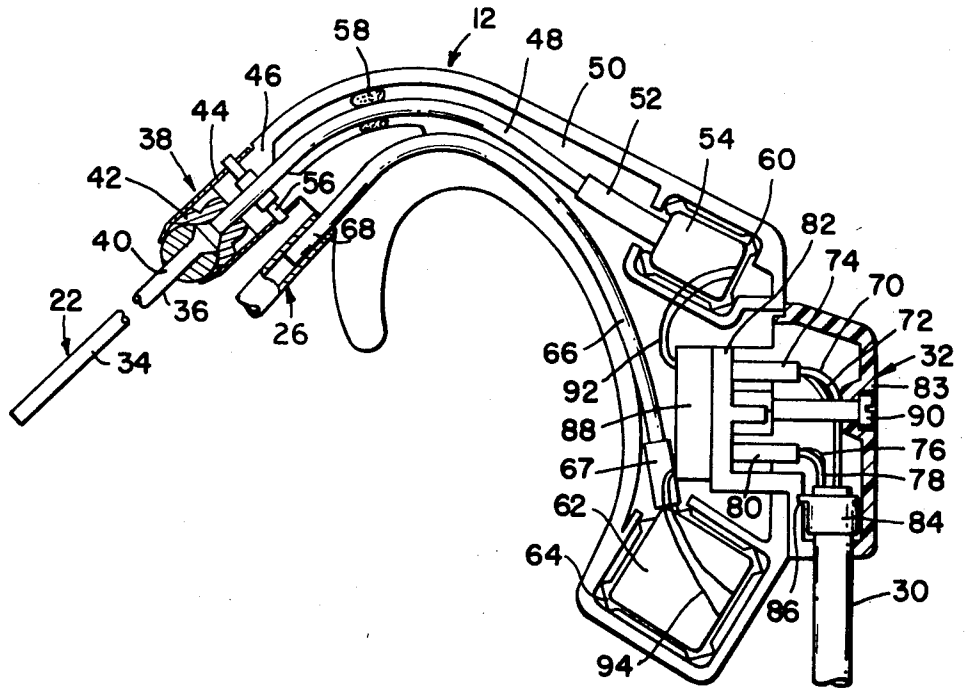
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ABSTRACT: A self-supporting headset is disclosed with a housing adapted to accommodate a receiver and microphone. The headset housing comfortably supports itself on the upper portion of an ear of the user. A flexible acoustic tube together with an adjustable voice tube are mounted on an upper portion of the housing forward of the user's ear. The acoustic tube curves backwardly to provide communication between the auditory canal of the user's ear and the receiver through a tube along the inner periphery of the housing. The voice tube provides communication between the user's mouth and the microphone. Electrical signals are carried to and from the microphone and receiver through a pin and socket connection together with a strain relief collar device mounting a lead wire cable to the housing.



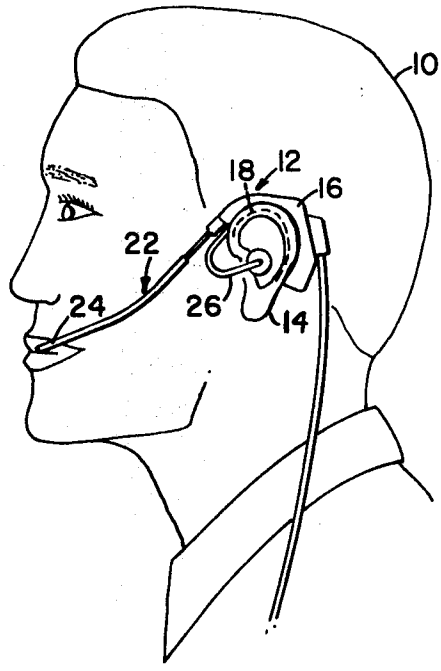


FIG_1

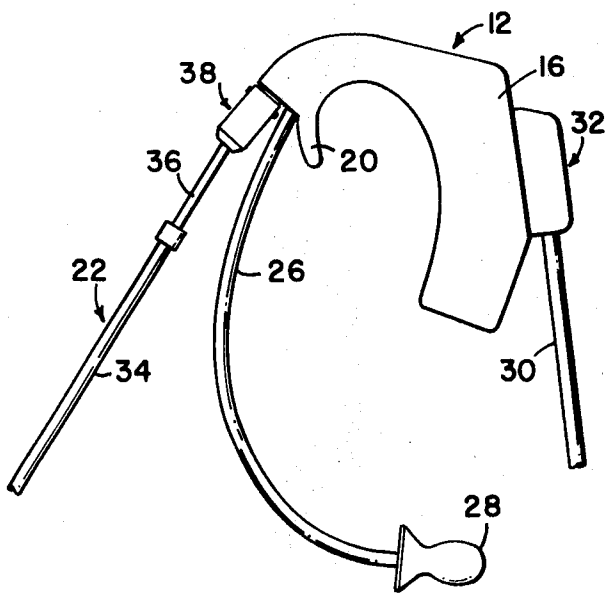


FIG_2

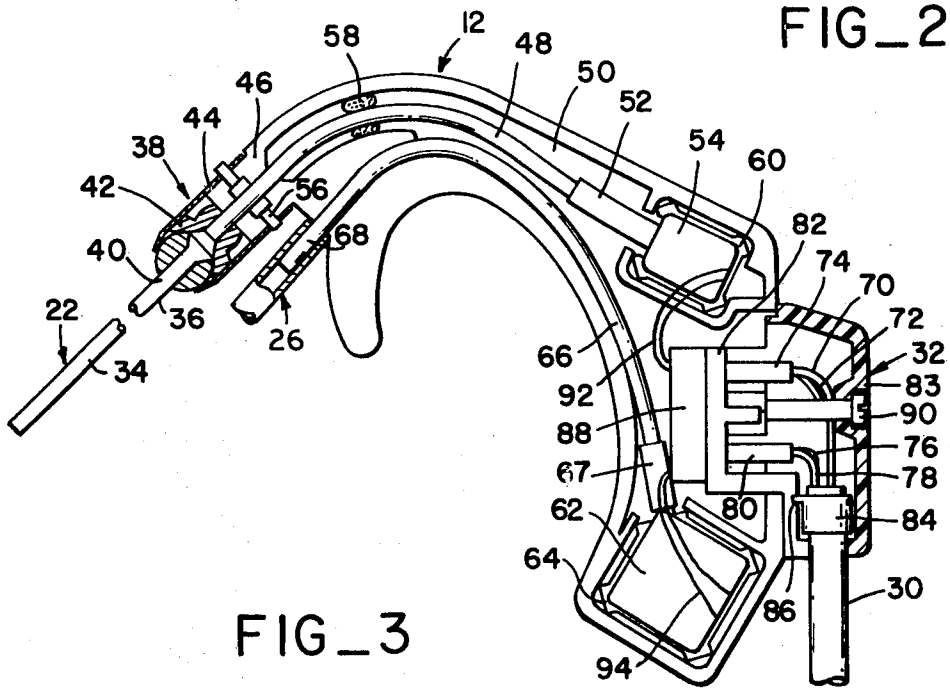


FIG_3

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SELF-SUPPORTING HEADSET

CROSS-REFERENCE TO RELATED APPLICATION

This is a continuation-in-part of my copending application Ser. No. 839,016, filed July 3, 1969, now U.S. Pat. No. 3,548,118.

BACKGROUND OF THE INVENTION

This invention relates generally to headsets and more particularly to headsets which contain a microphone and receiver and are adapted to be supported solely from the ear of the user.

Conventional headsets have included various intermediate supporting structures mounting the headset in cooperative relationship with the ear and mouth of the user. These supporting structures have included headbands and means for attaching the headset to portions of eyeglasses, but this has resulted in a cumbersome arrangement. Ear molds have also been used for supporting the headset from inside the ear, but this necessitates fitting of the ear mold to the individual users.

SUMMARY OF THE INVENTION AND OBJECTS

It is a general object of the present invention to provide a lightweight headset which can be comfortably and securely worn by telephone operators, radio operators, aircraft personnel, or other persons using communication systems.

Another object is to provide a headset which may be easily fitted on the user's ear, is balanced to rest comfortably on the ear without the necessity of a supporting headband or the like, and which provides complete working mobility for the user, in performing other duties.

Another object is to provide a headset for wearing on the ear of a user in which an improved socket arrangement is provided for connecting the electrical cable to the microphone and receiver outlets in the headset.

In general, the foregoing and other objects of the invention are achieved by a headset which comprises a housing shaped and balanced for comfortable wearing on the ear of the user. An extensible voice tube mounted on an upper forward end of the housing has a distal end adapted to be placed adjacent the mouth of the user for transmitting sound to the microphone. A flexible accoustic tube is mounted to the housing adjacent the voice tube and provides communication between the auditory canal of the ear and the receiver through a tube running along the inner periphery of the housing. The output leads from the microphone and receiver transducers connect with an electrical cable through a pin and socket arrangement. The cable is mounted on the housing by means of a strain relief collar providing an opening through a cover over the socket connection.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates the self-supporting headset of the present invention in position upon a user's ear;

FIG. 2 is an enlarged side elevational view of the headset; and,

FIG. 3 is an enlarged view of the headset with one side of the housing removed to show the internal elements thereof.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIG. 1, a user 10 is shown with a headset 12 according to the present invention mounted behind his ear 14. The headset includes a housing 16 defining a curved, inner periphery 18 adapted to fit comfortably over and behind the user's ear. As illustrated in FIG. 2, the housing includes a horn or projection 20 which extends over and engages the top of the ear to hold the housing in place.

An extensible voice tube 22 is mounted in the forward end of the housing 16 and extends downwardly and forwardly with its distal end 24 adjacent the user's mouth to receive voice communication therefrom. A flexible accoustic tube 26 is mounted on the forward end of the housing adjacent to and below the mounting connection for voice tube 22. An ear insert 28 mounted on the distal end of tube 26 is adapted to be inserted into the user's ear. Accoustic tube 26 provides communication between the auditory canal of the user's ear and the receiver transducer within the housing. An electrical cable 30 is mounted to the rear of the headset through cover assembly 32 and depends downwardly therefrom.

Referring to FIGS. 2 and 3, the headset 12 is illustrated in greater detail. Extensible voice tube 22 includes lower portion 34 telescoping with upper portion 36 so that the tube may be extended or retracted to adjust the position of distal end 24 with respect to the user's mouth. Tube 22 is supported from housing 12 by a ball and socket joint 38 adapted to pivotally adjust the angular relationship of the tube with respect to the housing. This joint 38 comprises a ball 40 fitting over the end of tube portion 36. The ball is mounted in socket 42 by means of a ferrule 44 mounted on a stub portion 46 of the housing. Socket 42 communicates with a tube 48 extending through a housing cavity 50 to a flexible tube 52 which in turn is connected with microphone transducer 54. Housing cavity 50 is formed between two mating housing parts one of which is shown in FIG. 3, secured together by suitable means such as pins or sonic bonding. Ferrule 44 detachably secures voice tube 22 to the housing 12 through slots in the sides of the ferrule which releasably engage a pair of pins 56 mounted in and extending radially from stub portion 46. Flexible tube 52 functions to isolate microphone 54 from any motion of housing 12. Tube 48 is held in the housing by epoxy material 58 with the two housing parts assembled together. Microphone transducer 54 is supported within the housing by a resilient boot 60 adapted to isolate the transducer from vibrations of the housing to protect the transducer from the effects of shock, and to decouple the microphone from receiver 62.

Flexible acoustic tube 26 is mounted to the upper, forward end of the housing adjacent to and below ball and socket connection 38. This mounting arrangement provides improved balancing features so that the headset is more comfortably worn by the user. Thus, the weight of both accoustic tube 26 and voice tube 22 provides a torque to balance the weight of the housing elements and cable 30 behind the ear. At the same time, accoustic tube 26 curves forwardly and then rearwardly for insertion in the user's ear so as not to interfere or become entangled with the user's wearing apparel, e.g. earrings, and does not interfere with the user's freedom of motion.

Receiver transducer 62 is resiliently supported within the lower portion of the housing by a resilient boot 64. This boot functions to decouple the receiver from the microphone to protect it from the effects of shock, and to isolate it from vibrations. An internal tube 66 is connected at one end with receiver 62 through flexible tube 67 and is directed upwardly within cavity 50 along the inner periphery of the housing where it extends through the housing at downwardly inclined projecting tube and 68. Flexible tube 26 is fitted over projection 68 and depends downwardly therefrom for insertion of fear insert 28 into the user's ear.

Cable 30 is secured to the housing by cover assembly 32 adapted to provide strain relief of the cable with respect to the housing. The microphone lead wires 70, 72 extend from the cable and are secured to a first pair of pins 74. The receiver lead wires 76, 78 extend from the cable and are secured to a second pair of pins 80. The four pins 74, 80 are inserted in and located by a support member 82 which together with base member 88 defines a socket assembly. A cover 83 is secured over the socket assembly to retain strain relief collar 84 in place. A projection 86 on collar 84 is anchored in the material of support 82, and cable 30 is mounted through collar 84 thereby providing firm support for the cable end as the cable flexes. The cover assembly is retained in position by a screw 90 engaging a nut, not shown, in the base member. Leads 92 are connected between pins 74 and microphone 54, while leads 94 are connected between pins 80 and receiver 62.

Referring now to FIGS. 1 and 2, it is seen that the headset is self-supporting on the operator or user's ear. The headset fits

behind the ear with the projection **20** extending over and engaging the top of the ear. Both the telescoped voice tube **22** and flexible accoustic tube **26** are mounted to the forward end of housing **12**. The weight of voice tube **22** provides a counterclockwise torque to the housing tending to counterbalance the weight of the rear housing portion and cable **30**. Accoustic tube **22** curves forwardly and downwardly to the ear where it does not interfere with the user's wearing apparel for freedom of movement. The accoustic tube is connected with a receiver within the housing by means of a tube extending along the inner periphery of a cavity in the housing. Cable **30** is mounted to the rear of the housing by a cover assembly in a manner providing convenient and rapid assembly and disassembly, while at the same time providing strain relief of the cable end with respect to the housing.

I claim:

1. A headset comprising: a housing adapted to be placed behind the ear of the user, the housing including a forwardly extending end projecting over the top of the user's ear, the housing defining an internal cavity; a microphone mounted within the cavity near the top of said housing; a forwardly extending voice tube mounted on the forward end of the housing, the voice tube having an upper portion communicating with said microphone, and a lower extensible portion pivotally connected with the upper portion and adapted to have its distal end positioned adjacent the user's mouth; a receiver disposed in the cavity near the bottom of the housing; a flexible accoustic tube mounted to the forward end of the housing adjacent the connection thereof with the voice tube, the accoustic tube having an internal tube segment mounted along the inner periphery of the housing cavity and in communication with the receiver, and an external tube segment projecting from the housing and adapted to communicate with the auditory canal of the user's ear.

2. A headset as in claim **1** and further characterized in that the internal tube segment of the accoustic tube includes a projecting tube end extending from the housing forward end adjacent to and below the connection of the extensible voice tube with the housing, and the external tube segment of the accoustic tube is connected with said projecting tube end.

3. A headset as in claim **1** and including an electrical cable; socket means for connecting said cable in electrical communication with the receiver and microphone within the housing; and, a cover assembly to mount the cable to the rear of the housing, the cover assembly including strain relief means to securely hold the cable end with respect to the housing and cover assembly.

4. The invention of claim **3** and further characterized in that the socket means includes a support member, the strain relief means includes a collar adapted to grip the cable end and having a projection embedded in the socket support, and fastener means to lock the cover assembly to the housing for holding the strain relief collar and cable to the socket support.